

What is claimed is:

- 1 1. A plasma reactor electrode comprising:
2 a first, upper plate for the transfer of RF energy;
3 a second, lower plate for the transfer of RF energy; and
4 a plurality of pins connecting the upper and lower plates to facilitate
5 thermal conductivity during RF energy transfer.
- 1 2. An electrode as claimed in claim 1, further comprising a dielectric cover
2 disposed below the lower plate.
- 1 3. An electrode as claimed in claim 2, wherein said dielectric cover is bonded
2 to said lower plate.
- 1 4. An electrode as claimed in claim 1, wherein said electrode is part of a
2 showerhead assembly, with holes extending through said lower plate and said cover.
- 1 5. An electrode as claimed in claim 1, further comprising an outer ring
2 surrounding said upper and lower plates; a first O ring disposed between said upper plate
3 and said outer ring; and the second O ring between said lower plate and said outer ring;
4 wherein said first and second O rings, said outer ring, and said first and
5 second plates are configured to form a plenum chamber; and
6 wherein a plurality of holes are formed to provide uniform gas distribution
7 in conjunction with said plenum chamber.

1 6. An electrode as claimed in claim 2, wherein said dielectric cover is made
2 of a material selected from the group consisting of ceramic and quartz.

1 7. An electrode as claimed in claim 5, wherein said outer ring comprises a
2 material selected from the group consisting of ceramic and quartz.

1 8. An electrode as claimed in claim 1, further comprising a lid disposed over
2 said upper plate.

1 9. An electrode as claimed in claim 8, wherein said lid is made of aluminum.

1 10. An electrode as claimed in claim 1, wherein said plurality of pins comprise
2 aluminum, and said upper and lower plates comprise aluminum.

1 11. A method of forming a plasma reactor electrode, comprising:
2 attaching a first, upper plate to a second, lower plate with a plurality of
3 pins;
4 attaching a dielectric cover below said lower plate; and
5 providing an outer ring around said upper and lower plates, with respective
6 first and second O rings between said first, upper plate and said outer ring, and
7 between said second, lower plate and said ring, so as to form a plenum chamber
8 among said upper and lower plates, said first and second O rings, and said outer
9 ring.

1 12. A method as claimed in claim 11, wherein said pins, and said first and
2 second plates are made of aluminum, and said dielectric cover is made from a material

3 selected from the group consisting of ceramic and quartz, said outer ring being made from
4 a material selected from the group consisting of ceramic and quartz.

1 13. A method as claimed in claim 11, further comprising providing a lid over
2 said first, upper plate, said lid having an opening for the insertion of processed gas.

1 14. A plasma reaction chamber comprising:
2 a chamber; and
3 a plasma reactor electrode, said electrode comprising a first, upper plate
4 for the transfer of RF energy, a second, lower plate for the transfer of RF energy,
5 and a plurality of pins for connecting said first and second plates to facilitate
6 thermal conductivity during RF energy transfer.

1 15. A chamber as claimed in claim 14, further comprising an outer ring
2 surrounding said upper and lower plates, and respective O rings between said upper plate
3 and said outer ring, and said lower plate and said outer ring, so as to form a plenum
4 chamber with said upper and lower plates, said outer ring, and said O rings.

1 16. A chamber as claimed in claim 14, further comprising a dielectric cover
2 attached to said lower plate.